ABSTRACT OF THE DISCLOSURE

A method of treating a human subject having airway or vascular disease is disclosed that comprises administering to at least one cell type selected from the group consisting of airway epithelial cells, airway smooth muscle cells, blood vessel endothelial cells, and blood vessel smooth muscle cells, a first composition comprising a vector comprising a DNA sequence encoding a β_2AR (β_2-adrenergic receptor) or a mutant thereof, operably linked to a promoter that is functional in at least one of said cells said subject, under conditions whereby the DNA sequence encoding the β_2AR is expressed in at least one of the cells; and optionally administering a second composition comprising at least one β_2-adrenergic agonist into the cells of said subject. A further pharmaceutical composition may be administered comprising a hormone or pharmacological agent that induces the promoter to express the β_2AR in at least one of the target cells. Pharmaceutical compositions comprising the vector comprising a DNA sequence encoding a β_2AR or a mutant thereof, operably linked to a promoter that is functional in at least one of the cells of the subject and kits containing these compositions are also disclosed. An *in vitro* method of expressing the β_2AR gene in mammalian cells and a method of evaluating the effect of pharmacological compounds on the expression of the β_2AR gene is disclosed.

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